

MANUFACTURED FOR:
MITSUBISHI ELECTRIC US, INC.

Electric Heat Lockout

ETC-211000-MIT

INSTALLATION MANUAL

FOR INSTALLER

For safe and correct use, please read this operation manual thoroughly before operating the air-conditioner unit.

English

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The optional electric heat lockout control ETC-211000-000 can be used with Mitsubishi Electric models PVA and MVZ air handlers to lockout out electric heat above a desired ambient temperature. The electric heat lockout control is a microprocessor based electronic temperature control with a built in non volatile EPROM to retain settings if a power outage is to occur. The electric heat lockout control provides constant temperature readout of ambient conditions and allows the user to easily select the lockout temperature and differential for stage one and stage two of electric heating. If desired, each stage of heating can be set to lockout independently above a certain ambient temperature. The electric heat lockout can also be used when only single stage heating exists.

Mitsubishi Electric's heat pumps ability to produce heat down to lower ambient temperatures (please refer to the engineering information for the outdoor unit) versus standard heat pumps means that tremendous energy savings can be realized by successfully locking out the ability to turn electric heat on. This is due to the fact that a large amount of the rated capacity of the heat pump is available in low ambient conditions and electric heat is not needed to maintain a desired indoor temperature.

1. Warning and Safety Precautions

Follow the instructions provided here. Do not use this control for any other purpose.

Before installing the unit, make sure you read all the "Safety precautions".

The "Safety precautions" provide very important points regarding safety. Make sure you follow them.

Symbols used in the text

Warning:

This symbol denotes what could lead to serious injury or death if you misuse the Electric Heat Lockout

Caution:

This symbol denotes what could lead to a personal injury or property damage if Electric Heat Lockout is misused

After reading this instruction manual, keep it in a place where the end user can find it anytime he or she wants to. When someone moves, repairs or uses the Electric Heat Lockout, make sure to forward this manual to the final user.

Warning:

- **Ask your technical representative to install the unit. Any deficiency caused by your own installation may result in electric shock or fire.**
- **Ensure that installation work is done correctly following this instruction manual. Any deficiency caused by installation may result in electric shock or fire.**
- **Firmly connect the wiring using the specified cables. Carefully check that the cables do not exert any forces on the terminals. Improper wiring connections may produce heat and possibly fire.**
- **Never modify or repair the Electric Heat Lockout. Any deficiency caused by your modification or repair may result in electric shock or fire. Consult with your technical representative about repair.**
- **All electrical work must be performed by a licensed technician, according to the local regulations and the instructions given in this manual. Any lack of electric circuit or any deficiency caused by installation may result in electric shock or fire.**
- **Stop the operation if any malfunction occurs. If malfunction occurs (burning smell, etc.) stop the operation and turn off the power supply. Contact your technical representative. If the controller continues to operate after a malfunction occurs, this may cause damage, electric shock or fire.**
- **Do not turn on the main power until installation has been completed. Doing so may result in electric shock or fire.**
- **Keep the Electric Heat Lockout clean. Dust particles that enter the control may cause fire.**
- **Do not move and re-install the Electric Heat Lockout yourself. Any deficiency caused by the installation may result in electric shock or fire. Ask your distributor or special technical representative for moving and installation.**

Caution:

- **Do not install in any place exposed to flammable gas leakage. Flammable gases that accumulate around the Electric Heat Lockout may cause an explosion.**
- **Do not use in any special environment. Using in any place exposed to oil (including machining oil), steam and sulfuric gas may deteriorate the performance significantly or give damage to the component parts.**
- **Do not install in any place at a temperature of more than 104° F or less than 32° F or exposed to direct sunlight.**
- **Do not install in any place where acidic or alkaline solution or special spays are often used. Doing so may cause an electric shock or malfunction.**
- **Wire so that it does not receive any tension. Tension may cause wire breakage, heating or fire.**
- **Do not install in an environment where moisture is condensed into water. Doing so may cause electric shock or malfunction.**
- **Do not wash with water. Doing so may cause electric shock or malfunction.**

2. Features

- Wide setpoint temperature range (-30° F to 220° F) and differential adjustment (1° F to 30° F)
- Simple keypad programming of setpoint temperature and differential.
- Ability to locate the thermocouple up to 400 feet away
- SPDT output. One normally open (NO) contact for stage one and one for stage two. Each stage of heating can be set to different lockout out temperatures.
- User selectable Fahrenheit/Celsius scales.
- Lockout switch to prevent tampering by unauthorized personnel
- Choice of line voltage. (120V or 208/240VAC)

3. Specifications

Input Voltage:	120 or 208/240 VAC, 50/60 Hz
Temperature Range:	-30° F to 220° F
Differential Range:	1° F to 30° F
Switch Action:	SPDT (for each stage of heating)
Sensor:	Thermistor, 1.94 in. length x 0.25 in. diameter with 8ft cable. Cable is extendable up to 400 feet.
Power Consumption:	120/208/240 VAC: 100 mA

4. Operation

Liquid Crystal Display (LCD)

The LCD display provides a constant readout of the sensor temperature and indicates if either of the two stages of heat are able to be energized. When the S1 is constantly illuminated during operation, the Stage 1 relay is energized. Likewise, when the S2 is constantly illuminated during operation, the Stage 2 relay is energized allowing electric heat if required. The display is also used in conjunction with the keypad to allow the user to adjust the electric heat lockout temperature and differential for each stage.

Control Setup

The temperature setpoint refers to the temperature at which the normally open (NO) contact of the output relay will close allowing the electric heat to activate if required.

Programming Steps and Display

The electric heat lockout can be programmed in seven simple steps using the LCD display and the three keys on the face of the control. Before the programming can be completed, the electric heat lockout must be powered and wired according to the electrical schematic provided.

Step.1

To start programming, press the **SET** key once to access the Fahrenheit/Celsius mode. The display will show the current status, either F for degrees Fahrenheit or C for degrees Celsius. Press the arrow up or down key to toggle between F or C designation.

Step.2

Press the **SET** key again to access the stage 1 lockout temperature. The LCD will display the current temperature at which stage 1 of electric heat is locked out. The S1 annunciator will be blinking on and off to indicate when stage 1 of electric heat is not locked out and available if demanded. Press either the up key to increase or the down key to decrease the ambient temperature at which electric heat is locked out above.

Step.3

Press the **SET** key again to access the stage 1 differential. The LCD will display the current differential and DIF 1 annunciator will be blinking on and off to indicate that the control is in the differential mode. Then press either the up key to increase of the down key to decrease the differential to the desired setting.

Step.4

Press the **SET** key again to access the stage 1 mode. The LCD will need to display H1. Press the up or down key to toggle to the correct mode of H1.

Step.5

Press the **SET** key gain to access the stage 2 heating lockout temperature. The LCD will display the current lockout temperature above which stage 2 of electric heat is locked out. The S2 annunciator will be blinking on and off to indicate that stage 2 of electric heat is not locked out and available if demanded. Press either the up key to increase or the down key to decrease the ambient temperature at which the electric heat is locked out above.

Step.6

Press the **SET** key again to access the stage 2 differential. The LCD will display the current differential and the DIF 2 annunciator will be blinking on and off to indicate that the control is in the differential mode. Then press either the up key to increase of the down key to decrease the differential to the desired setting.

Step.7

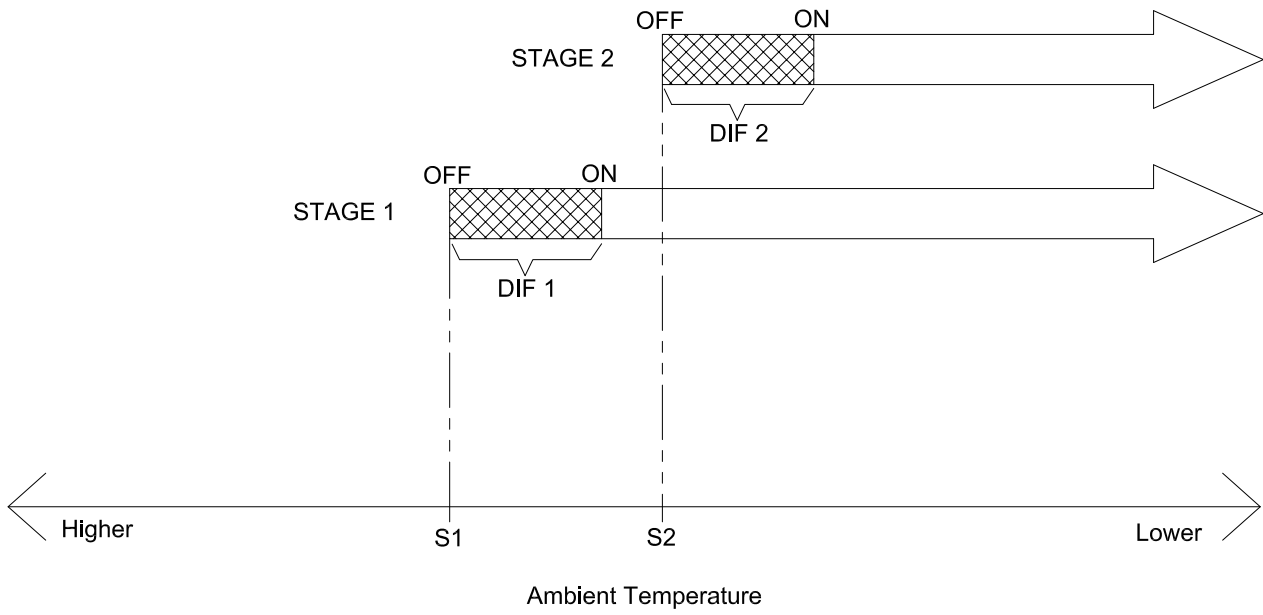
Press the **SET** key again to access the stage 2 mode. The LCD will need to display H2. Press the up or down key to toggle to the correct mode H2.

Step.8

Press the **SET** key once more and the programming is complete. Note: The Electric Heat lockout control will automatically end programming if no keys are depressed for a period of thirty seconds. Any settings that have been input to the control will be accepted at that point.

All control settings are retained in non-volatile memory if power to the electric heat lockout control is interrupted for any reason. Re-programming is not necessary after power outages or disconnects unless different control settings are required.

The chart provided below explains how the electric heat lockout will function for stage 1 and stage 2 once steps 1 through 8 are completed.



Specific Example Explained

The installer sets S1 to 25° F and DIF 1 to 3° F for stage 1 and sets S2 to 20° F and DIF 2 to 3° F, for Stage 2, the current ambient condition is 35° F at 5pm, during this time both stages of electric heat are locked out. During the night the temperature decreases to 22° F (25° F-3° F=22° F) and the S1 is displayed on the electric heat lockout. Once this occurs, stage 1 of electric heat is available when the demand comes from the indoor controller. The call for this demand is based on the setpoint of the home and current temperature of the home. As the temperature continues to drop outside to 17° F (20° F-3° F=17° F) S2 is displayed on the electric heat lockout and stage 2 is available when the demand comes from the indoor controller. When morning arrives the ambient temperature increases. At 20° F ambient temperature, stage 2 of electric heat is no longer available and the S2 display is removed. At 25° F ambient temperature, stage 1 of electric heat is no longer available and the S2 display is removed.

Lockout Switch

The electric heat lockout is provided with a lockout switch to prevent tampering by unauthorized personnel. When placed in the **LOCK** position, the keypad is disabled and no changes to the settings can be made. When placed in the **UNLOCK** position, the keypad will function normally. To access the lockout switch, disconnect the power supply and open the control. The switch is located on the inside cover about 2 inches above the bottom. To disable the keypad, slide the switch to the left **LOCK** position. To enable the keypad, slide the switch to the right **UNLOCK** position. All electric heat lockout controls are shipped with this switch in the **UNLOCK** position.

Display Messages

E1 – Appears when either the up or down key is pressed when not in the programming mode. To correct, if the E1 message appears even when no keys are being pressed, replace the control.

E2 – Appears if the control settings are not properly stored in memory. To correct, check all settings and correct if necessary.

EP – Appears when the probe is open, shorted or sensing a temperature that is out of range. To correct, check and see if the sensed temperature is out of range of the chart below. If not, check probe for damage and replace if necessary (P/N 1309007-044).

° C	° F	Resistance (Ohms)
-40	-40	1,010,000
-30	-22	531,000
-20	-4	291,200
-10	14	166,000
0	32	97,960
10	50	59,700
20	68	37,470
25	77	30,000
30	86	24,170
40	104	15,980
50	122	10,810
60	140	7,464

EE – Appears if EEPROM data has been corrupted. To correct, replace the control.

CL – Appears if calibration mode has been entered. To correct, remove power to the control for at least five seconds and reapply power. If the CL message still appears, replace the control.

Control Mounting Inside

Mount the electric heat lockout control to a wall or any flat surface using a combination of any two or more of the slotted holes located on the back of the control. The control's components are not position sensitive, but should be mounted so that they can be easily wired and adjusted. Avoid excessive conditions of moisture, dirt, dust and corrosive atmosphere locations. The electric heat lockout control has provisions for ½ inch conduit connections. The conduit hub should be secured to the conduit before securing the hub to the plastic housing of the control. When using the conduit entry in the rear of the control, a standard plug should be inserted into the conduit hole in the bottom. Caution should be exercised not to damage the control circuit board or wiring when installing a conduit connector.

Sensor Mounting

The sensor itself is weather-tight and suitable for outdoor locations. The recommended wall or side of the building for mounting is the North side. The effects of sun warming the other 3 sides of the building can produce unacceptable temperature errors under the right conditions. If the North side of the building is used as recommended, the mounting height can be from near ground level all the way up to the eave. It is always best to mount the sensor at least 2 to 3 feet above ground level and/or snow level. If the North side is not available, it can be mounted under a cover or shield to protect it from the sun. In areas where snow and ice could land on the sensor it should also be mounted under a cover or shield to protect it and prevent unacceptable temperature errors. The temperature sensor may be mounted using a rubber-lined tubing clamp

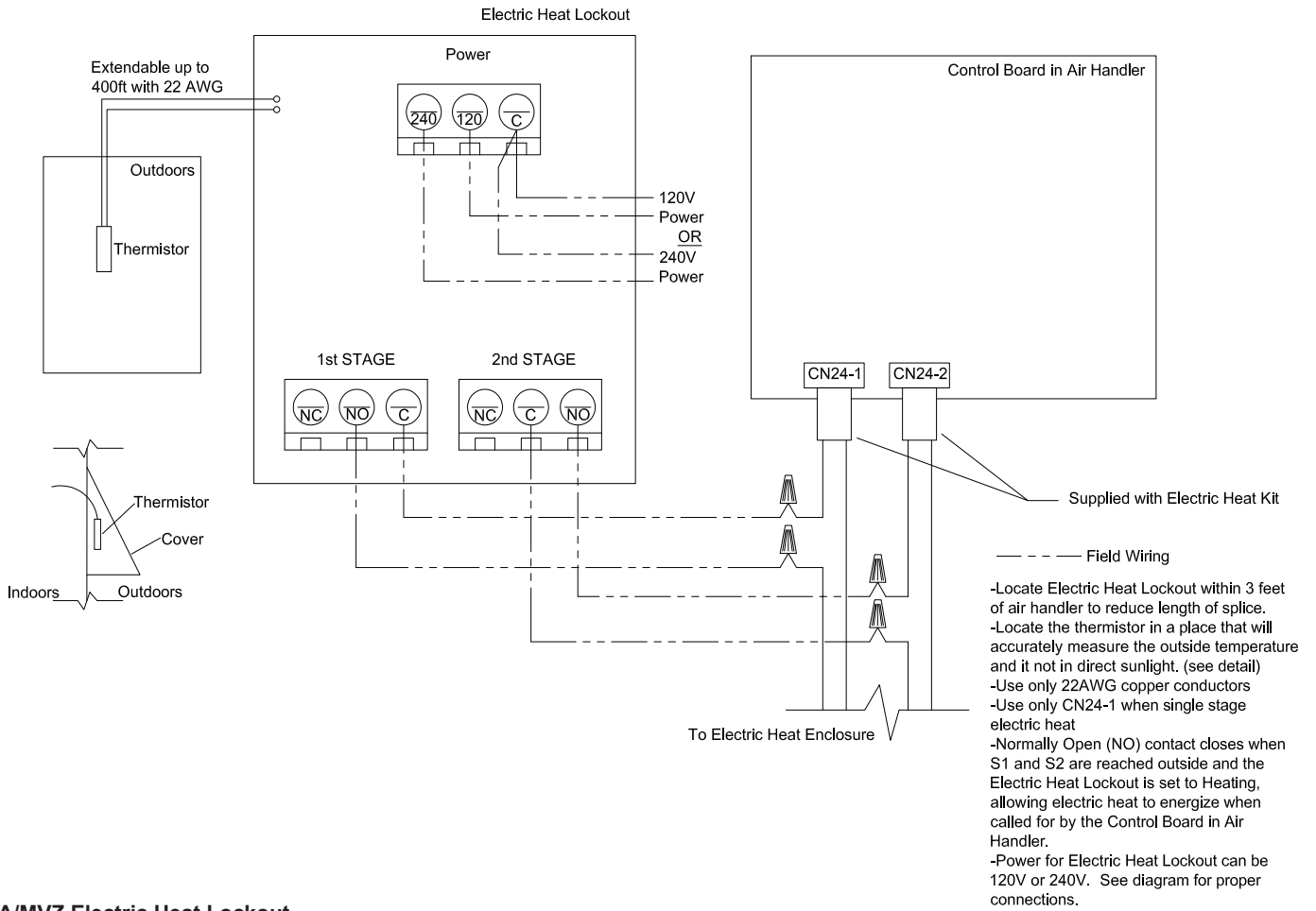
Extending Sensor

Sensor wiring splices may be made external from the control. Do not attempt to unsolder the sensor at the electric heat lockout board.

⚠ Caution:

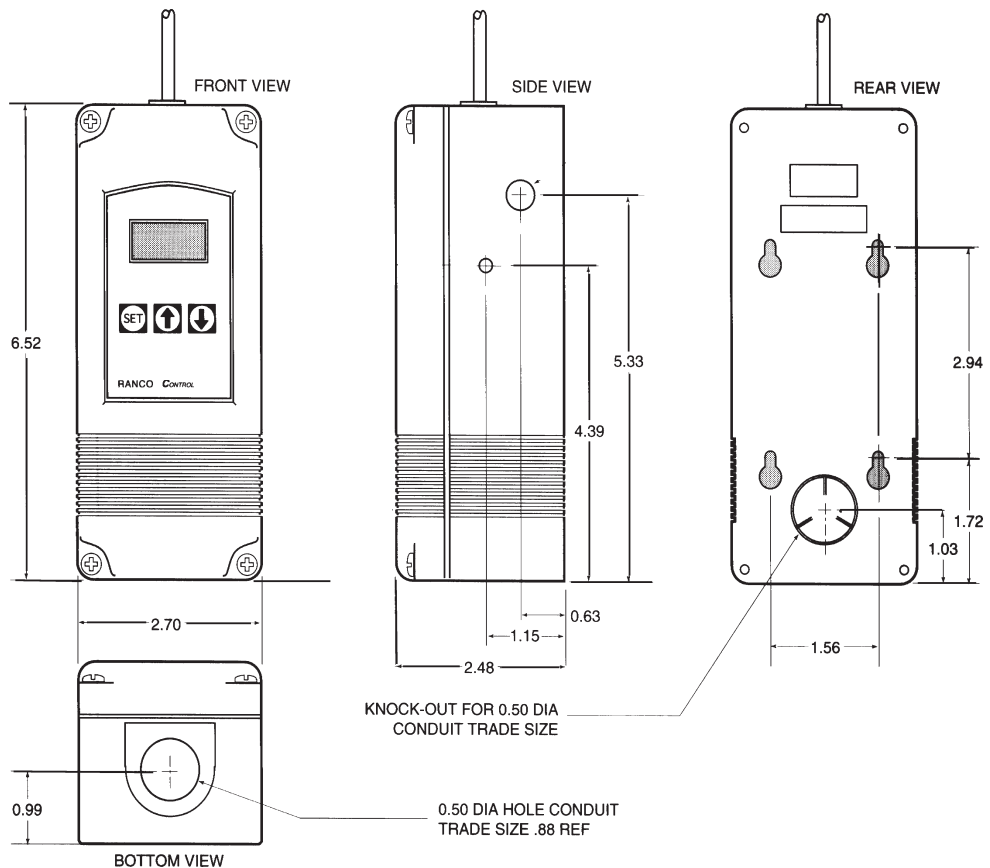
Disconnect power to the electric heat lockout control before wiring to avoid possible electrical shock or damage to the control. Additional cable can be spliced to the sensor cable to increase the length beyond the standard 8 feet. It can be extended up to 400 feet. The cable should be at least 22 AWG or larger to keep additional resistance to a minimum. All splices and wire length added to the sensor cable should be made according to acceptable wiring practices and should conform to the National Electrical Code and local regulations. Use copper conductors only. Shielded cable is not required.

Wiring Diagram



PVA/MVZ Electric Heat Lockout

Dimensional Drawing



This product is designed and intended for use in the residential,
commercial and light-industrial environment.

Please be sure to put the contact address/telephone number on
this manual before handing it to the customer.

Manufactured for:
MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN